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ABSTRACT

Investigations designed to eliminate ambiguities in the Andre and Kulhavy procedure and to investigate the effects of noun modifications and sentence voice in the category clustering of sentences were conducted. Two experiments were carried out; both employed a mixed factorial design and were prepared in dittoed booklets. The Ss were run in groups. Experiment 1 utilized students taking graduate or undergraduate educational psychology. Experiment 2 used introductory psychology students. It was found that modification of categorizable nouns reduces recall and that sentence voice failed to produce a significant difference in recall or clustering. It was also found that organization processes play some role in the learning and remembering of sentences. (Author/CK)

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Organizational Processes in the Free Recall of Sentences

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A considerable amount of evidence indicates that organizational processes play an important role in learning (Tulving, 1968; Kintsch, 1970). Most studies of organizational processes have utilized the method of free recall of noun lists. Very few studies have investigated organizational processes when material such as prose is learned (Frase, 1969). If educational implications are to be drawn from such research, it seems necessary to investigate the role of organizational processes when higher order materials are to be learned.

Cofer (1968) and Wood (1970) have shown that the presentation of nouns in a sentence context depresses the categorical clustering of the nouns. These authors have suggested that the sentence context weakens the categorical relationship of the nouns. In effect the noun becomes a referent to a specific instance instead of a member of a general category. When used in a sentence, cow refers to a specific animal and not a subcategory within the class of animals. Cofer et al (1969) has also shown that adjective-noun pairs are not clustered as much as the same nouns presented alone.

Andre and Kulhavy (1971) have suggested that instead of weakening category clustering, the effect of sentence context may be to provide the S with an alternative recall strategy. The syntactic or semantic organization of the sentence context may induce the S to use that organization as a retrieval strategy. In their study Andre and Kulhavy asked the Ss to recall a list of 12 sentences whose acted-upon nouns could be clustered into 3 categories. One group of Ss received passive voice versions of the sentences, the second group saw active voice versions. Although voice of sentence had no significant effect, both recall and clustering increased significantly over trials. Interpretation of the Andre and Kulhavy results was somewhat ambiguous since they had presented the list in a constant order in blocked format over trials. The Ss may have been recalling the words in presented order and not clustering.

In addition, Andre and Kulhavy (1971) used the four highest frequency instances in each of the four categories. They felt that the blocked presentation and the high frequency of the category members may have overridden any differential emphasis upon the acted-upon nouns produced by sentence voice. Some authors (Ammon, 1968; Herriot, 1969; Prentice, 1966; Slobin, 1968; Turner & Rommetveit, 1967)

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have indicated that passive voice is chosen in order to emphasize the acted-upon noun in a sentence. If this is the case, the passive voice sentences should produce more clustering since emphasizing the clusterable elements should lead the Ss to notice more quickly the basis for organization.

The present investigations were designed to eliminate these ambiguities in the Andre and Kulhavy procedure and to investigate the effects of noun modifications and sentence voice in the category clustering of sentences.

Method

Experiments: Two experiments were conducted. The experiments were alike in all respects save one; the acted-upon nouns that could be categorized differed. In Experiment 1 the acted-upon nouns consisted of low frequency instances associated to the category names; in Experiment 2 the acted-upon nouns were chosen from the same 3 categories as in Experiment 1, but were chosen so as to form a conceptual subcategory within the general category.

Design: Both experiments employed a 2 x 2 x 4 mixed factorial design. One factor, called noun modification, consisted of the presence or absence of adjectives modifying the acted-upon nouns. The second factor was sentence voice (passive or active). The third factor was trials. Subjects in the no adjectives passive group (NP) learned passive voice versions of the sentences without any adjective modifying the acted-upon noun. The Ss in the no adjective-active (NA) condition learned active voice sentences without adjectives. The adjective-passive (AP) and adjective-active (AA) groups learned passive sentences with adjectives and active sentences with adjectives respectively.

Materials: The sentences were prepared in ditto booklets on 8½ x 11 white paper. (In Experiment 2 the recall pages were blue.) Each study page of the booklet contained the twelve sentences appropriate for that condition in a random order. A recall page followed each study page; this page consisted of the directions "Write all the sentences you remember" and space for Ss to write the sentences. Typed in all caps along the bottom of the recall pages and study pages was the instruction "DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO". There were 4 study and 4 recall pages in the booklet. The sentences were presented in a new random order on each study page. A cover page for the booklet contained the directions for the experiment. The final page of the booklet consisted of a new random order of the sentences and the directions to organize the sentences into 2 through 6 categories. The S was free to use any categorization scheme he desired. Table 1 presents the modified active voice versions used in Experiment 1 and 2.

Procedure: The same procedure was used in Experiment 1 and 2. The Ss were run in groups; group size varied from about 20 to 50. Ss were assigned to an experimental condition by the simple expedient of randomly intermixing the booklets for each condition and distributing them in that order. Each condition was run at each experimental session. Once the booklets were distributed, E read the directions on the cover page aloud, while the Ss read them silently. After a pause for questions, E told Ss to turn to the first study page and begin studying the sentences. One minute was permitted for studying. At the end of the interval E instructed the Ss to turn to the next page and write all the sentences they could remember. Two minutes were allowed for recall. There were four study-test trials on the sentences. After the last trial the Ss were instructed to complete the sentence organizational task described above. Upon completion of this task, the Ss were permitted to leave.

Subjects: The Ss in Experiment 1 were 67 male and female graduate and undergraduate students at SUNY, Cortland, currently taking graduate or undergraduate educational psychology. Ninety-two students from the introductory psychology class at SUNY, Cortland participated in Experiment 2. All Ss received 1 point towards their final grade for participation in the experiment.

Results

The dependent variable consisted of the number of sentences recalled on each trial and the percentage of possible clustering on each trial. A sentence was scored as recalled correctly if the S wrote down the first noun, the verb, and the second noun in the correct order. The percentage of possible clustering consisted of the number of obtained category repetitions divided by the number of possible repetitions. Since the number of Ss per cell was unequal in Experiment 1, an unweighted means ANOVA was carried out on the number of sentences recalled and the percentage clustering measures. Since cell n was equal in Experiment 2, the standard ANOVA procedure was used. The means for each condition are presented in Figures 1 and 2. As Figure 1 indicates, recall increases over trials and recall of no-adjective sentences is superior to recall of modified sentences. The ANOVAs support these conclusions. Significant main effects for the noun modification and trials factors were obtained. Table 2 presents the Fs. With respect to the recall measure no other effects were significant, except for a significant interaction of noun modification and trials in Experiment 2. This interaction is plotted in Figure 3. Subjects in the no-adjective condition seem to learn at a faster rate than Ss in the adjective condition.

With respect to the percentage of clustering measure, the only significant main effect occurred for trials in both Experiment 1 and Experiment 2. These data are plotted in Figure 2. As can be seen, percentage clustering increases over trial. Experiment 1 also produced a significant noun modification by voice by trial interaction. It is likely that this interaction occurred because of the relatively high clustering scores for condition NA and AP on the second recall trial. No other effects were significant in either experiment.

The mean percentages of Ss adopting the categorical organization scheme on the final task are presented in Table 3. As can be seen, the percentage of Ss adopting E's organization is higher in the passive than in the active conditions. The results were not significant however. It also can be noted that percentages were much higher in Experiment 2 than in Experiment 1.

Discussion

The results of the present experiments supported the previous conclusions of Cofer et al (1969) that modification of categorizable nouns reduces recall. In both experiments recall of the modified sentences was less than that of the unmodified sentences. With respect to clustering however, the results were less clear. No differences were found in clustering as a function of noun modification. To some extent these results parallel those of Cofer et al as well; in their experiments those authors failed to find consistent effects of noun modification on clustering. Sometimes modification produced more clustering, sometimes less. Differences were only of marginal significance at best (Cofer et al, 1969, p. 264).

The failure of noun modification to similarly effect clustering and recall raises questions about the presumed cause and effect relationship between these two variables. If recall is a function of organization, then it is difficult to see how recall could be reduced without a reduction in clustering.

One explaination might be that the organization strategy employed by the S is similar to but not equivalent with the organization measured by the number of repetitions in the Ss recall. If this is the case then the percentage of clustering should increase over trials as does recall, but the correlation between the two would not be perfect. Such an interpretation raises the question of how this covert strategy may be tapped. One possibility may be to use an intertrial repetition measure even with lists that may be categorized.

The sentence voice factor has fared poorly in three experiments on sentence clustering. In the Andre and Kulhavy (1971) study, sentence voice failed to produce a significant difference in recall or clustering; this was also the case in the present experiments. If there is a differential emphasis on the acted-upon nouns in active and passive voice versions of sentences, this differential emphasis does not seem powerful enough to affect sentence recall or category clustering. It is curious, however, that the voice factor seems to produce a consistent (though nonsignificant) difference in performance on a post learning organization task. In all three experiments Ss learning passive voice versions of the sentences more frequently organized the sentences by conceptual category of the acted upon nouns than did Ss learning active voice sentences.

Finally, the present study has confirmed the Andre and Kulhavy (1971) conclusion that organization processes play some role in the learning and remembering of sentences. One problem with the Andre and Kulhavy study had been that they had presented the sentences in blocked format and in constant order over trials. This meant that instead of clustering, the Ss may have been recalling the words in the order presented. Since in the present study, clustering appeared when the sentences were presented in a new random order on each trial, that interpretation seems unlikely. Rather clustering occurs in the free recall of sentence lists as well as noun lists.

References

Ammon, P. R. The perception of grammatical relations in sentences: a methodological exploration. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 869-875.

Andre, T. & Kulhavy, R. W. Category clustering in the free recall of sentences. Psychological Reports, 1971, 29, 631-634.

Battig, W. F. & Montague, W. E. Category norms for verbal items in 56 categories: a replication and extension of the Connecticut Category Norms. Journal of Experimental Psychology, Monograph, 1969, 80, No. 3, Part 2.

Cofer, C. N. Free recall of nouns after presentation in sentences. Journal of Experimental Psychology, 1968, 78, 145-152.

Cofer, C. N., Segal, E., Stein, J., & Walker, H. Studies on free recall of nouns following presentation under adjective modification. Journal of Experimental Psychology, 1969, 79, 254-264.

Frase, L. Paragraph organization of written materials: The influence of conceptual clustering upon the level & organization of recall. Journal of Educational Psychology, 1969, 60, 394-401.

Herriot, P. The comprehension of active and passive sentences as a function of pragmatic expectations. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 166-170.

Prentice, J. L. Semantics and syntax in word learning. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 279-284.

Slobin, D. I. Recall of full and truncated passive sentences in connected discourse. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 73-81.

Turner, E. A., & Rommetveit, R. The acquisition of sentence voice and reversability. Child Development, 1967, 38, 649-660.

Wood, G. Free recall of nouns presented in sentences. Psychonomic Science, 1970, 18, 76-77.

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Table 1

Modified Active Voice Sentences
from Experiments 1 and 2

Experiment 1

The dust covered the grassy hillock.
The commision photographed the oddshaped pothole.
The party found the peaceful coast.
The explosion destroyed the narrow abyss.
The collapse crushed the spotted fawn.
The woodpile hid the brown impala.
The child heard the furry badger.
The truck frightened the black colt.
The idea excited the brilliant meteorologist.
The agency removed the hardworking projectionist.
The caller bored the famous designer.
The play angered the successful florist.

Experiment 2

The dust covered the grassy ravine.
The commission photographed the oddshaped gorge.
The party found the peaceful canyon.
The explosion destroyed the narrow abyss.
The collapse crushed the spotted horse.
The woodpile hid the brown cow.
The child heard the furry goat.
The truck frightened the black sheep.
The idea excited the brilliant obstetrician.
The agency removed the hardworking physician.
The caller bored the famous dentist.
The play angered the successful surgeon.

Note: In Experiment 1 the clusterable nouns were taken from low frequency associates to the category names in the Battig and Montague (1969) norms. In Experiment 2 the nouns were chosen from the same categories as in Experiment 1, but without regard to frequency. Instead the nouns were chosen to form a conceptual subcategory within the major category.

Table 2

Significant F Ratios from Experiment 1 and 2

Recall Scores	df	MS	F
Exp. 1			
Noun Modific.(NM)	1	10.9859	19.3584**
Trials	3	33.0371	3.9941**
Exp. 2			
Noun Modific.	1	590.01	48.44**
Trials	3	565.43	401.01**
Trials X NM	3	15.92	11.29**
Percentage Clustering			
Exp. 1			
Trials	3	.01561	4.002
Trials X Voice NM	3	.0138	3.539*
Exp. 2			
Trials	3	1.036	3.622*

* p .05
**p .01

Table 3

Percentage of Ss Organizing the Sentences by Categories on the Post-Learning Organization Task

	Experiment 1	Experiment 2
AP	91.3	47.1
NP	87.0	41.2
NA	73.9	17.6
AA	78.3	25.0

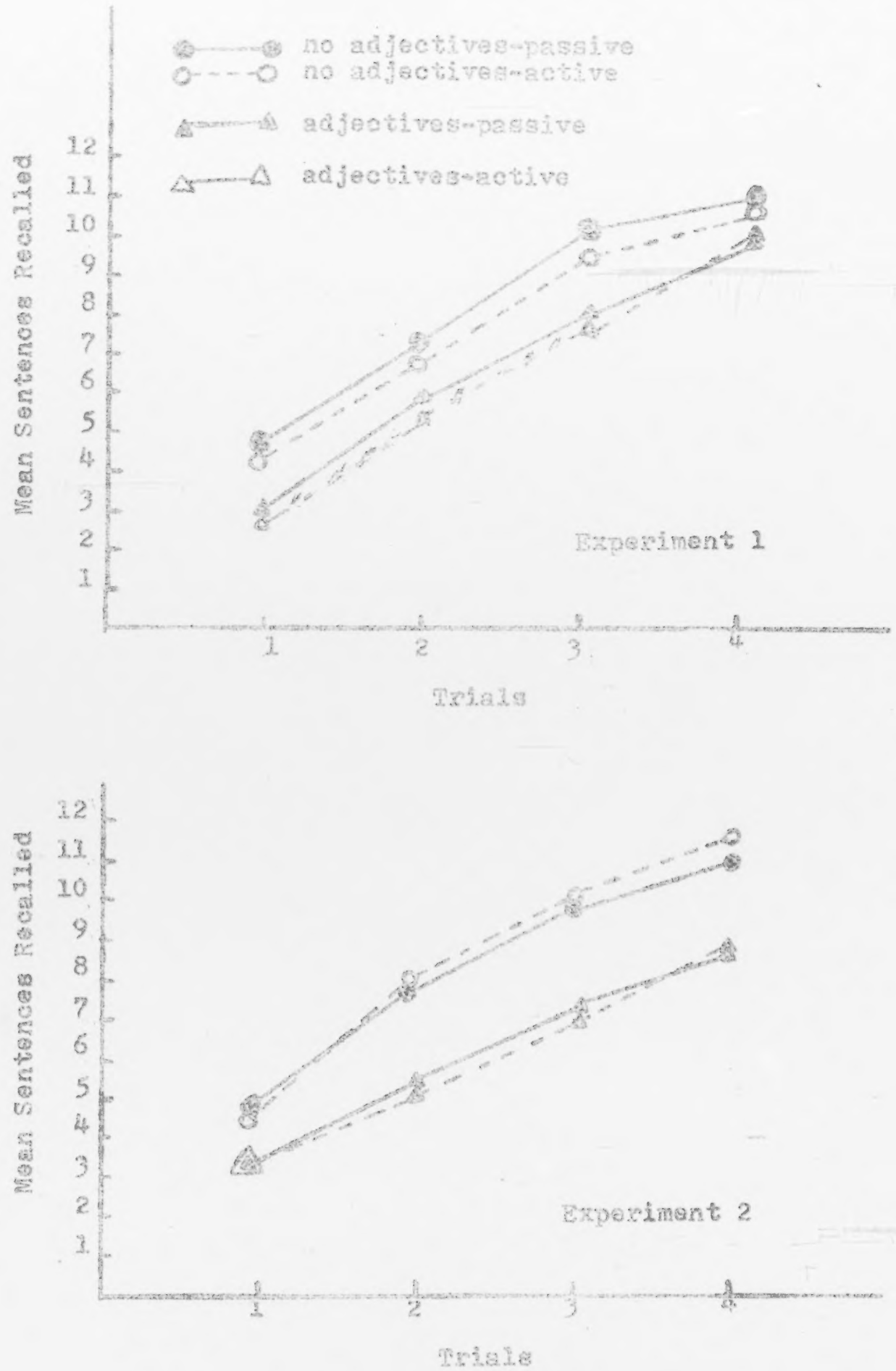
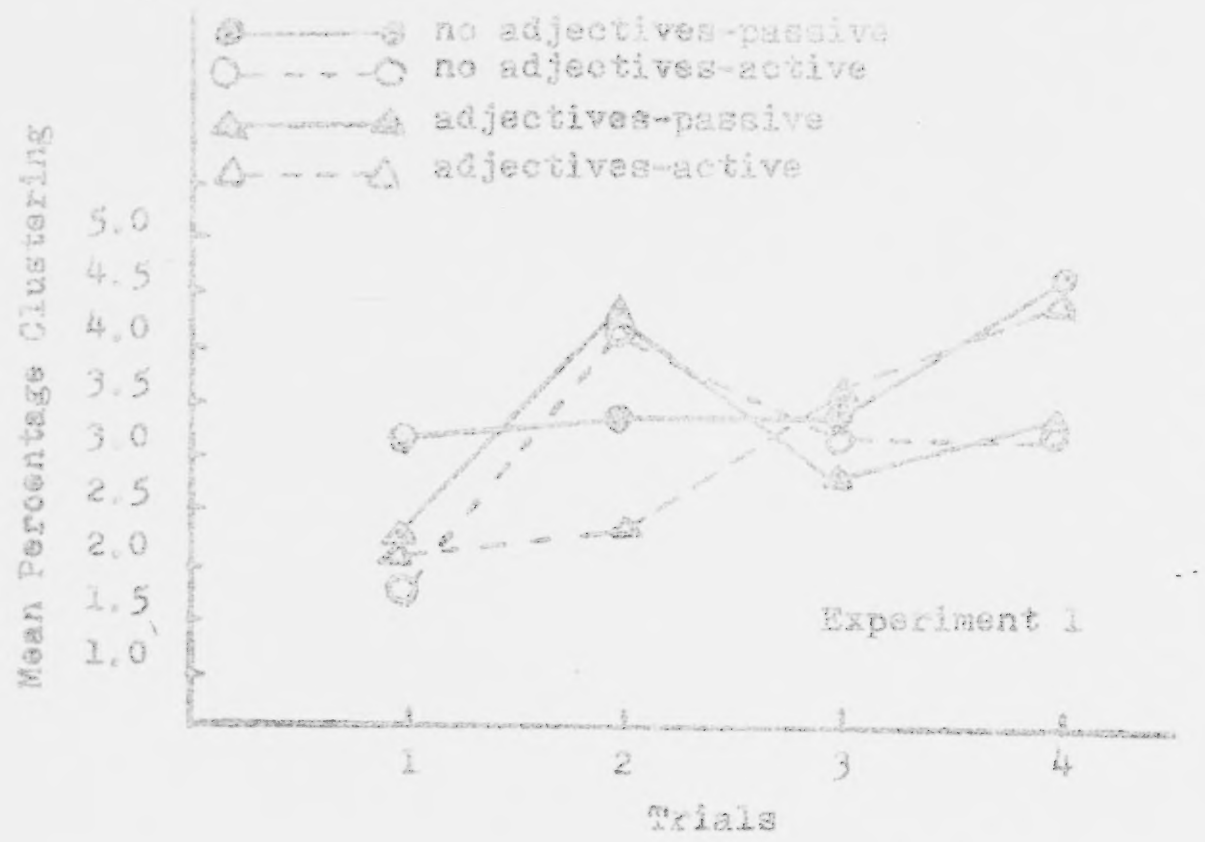


Figure 1. Mean Sentences recalled as a function of noun modification, sentence voice, trials, and experiment.



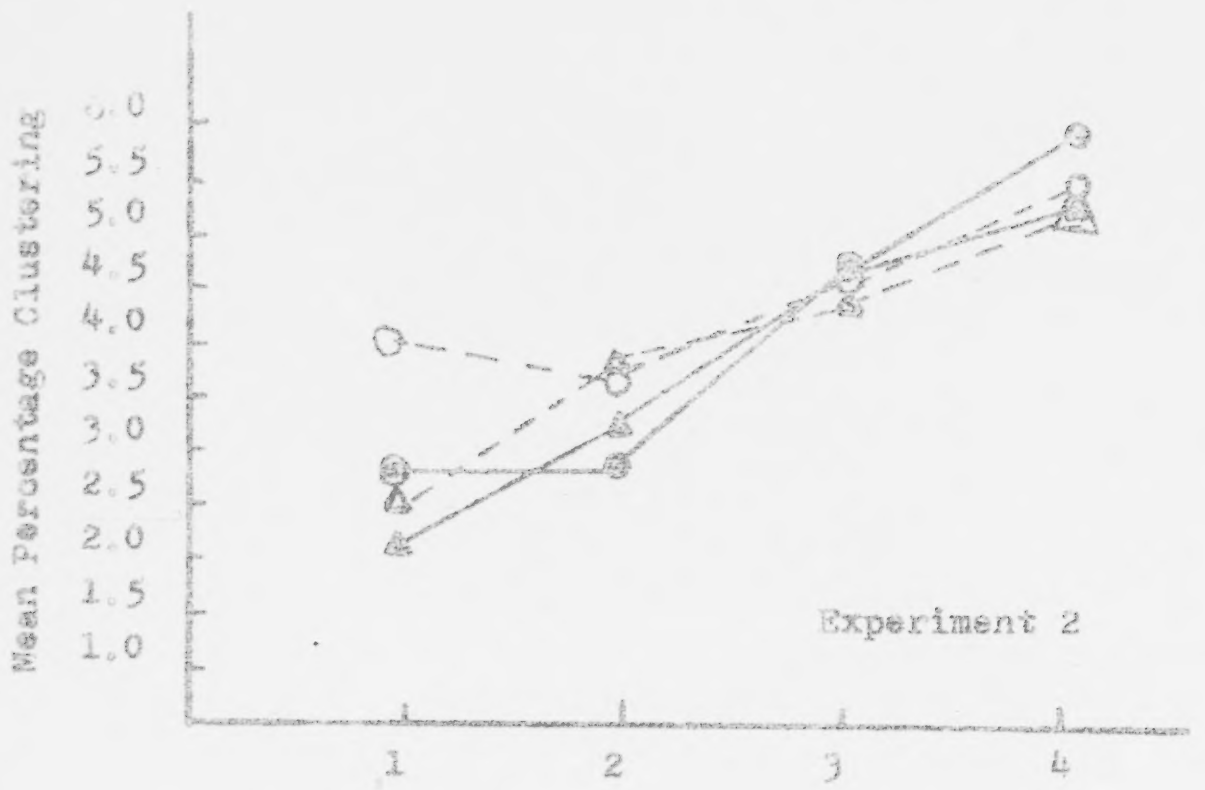


Figure 2. Mean percentage of possible clustering as a function of noun modification, sentence voice, trials, and experiment.

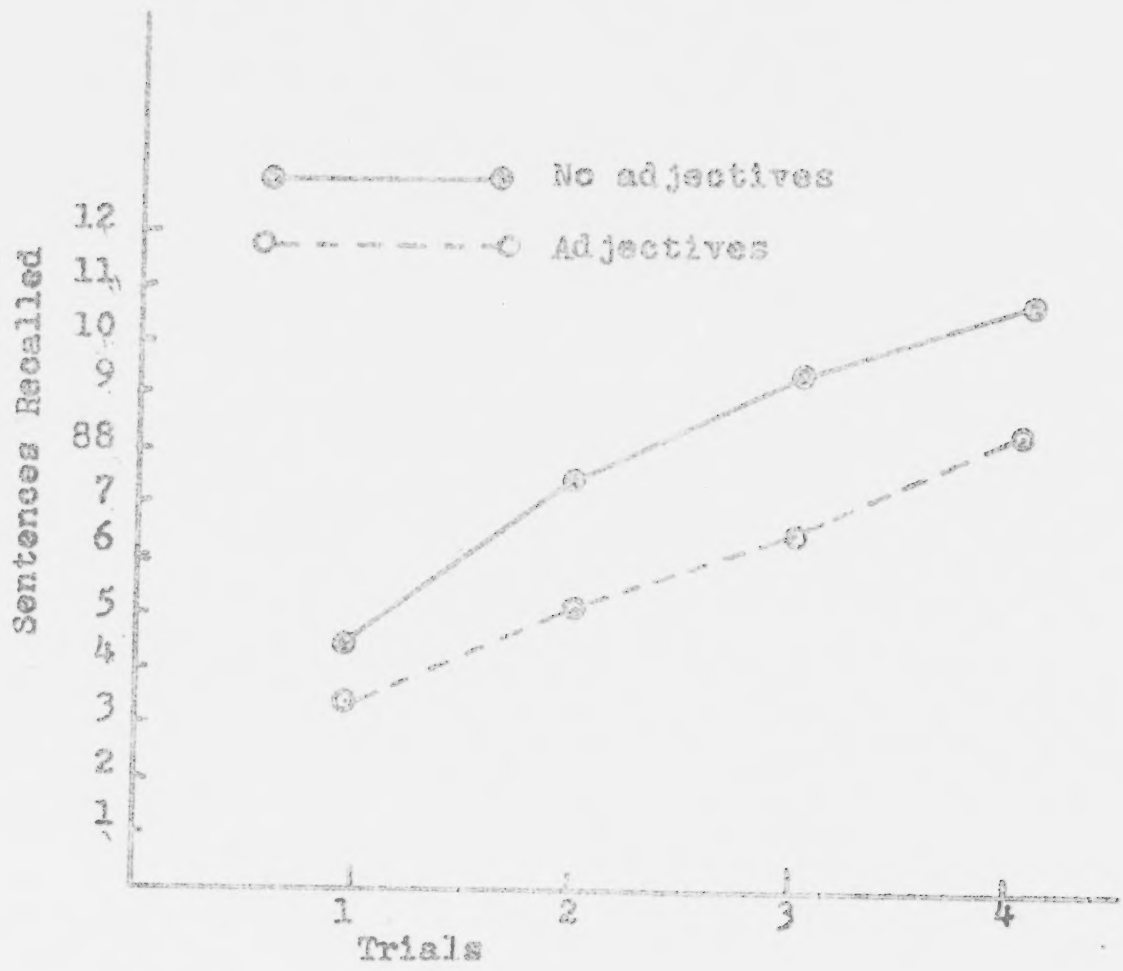


Figure 3. The number of sentences recalled as a function of noun modification and trials.